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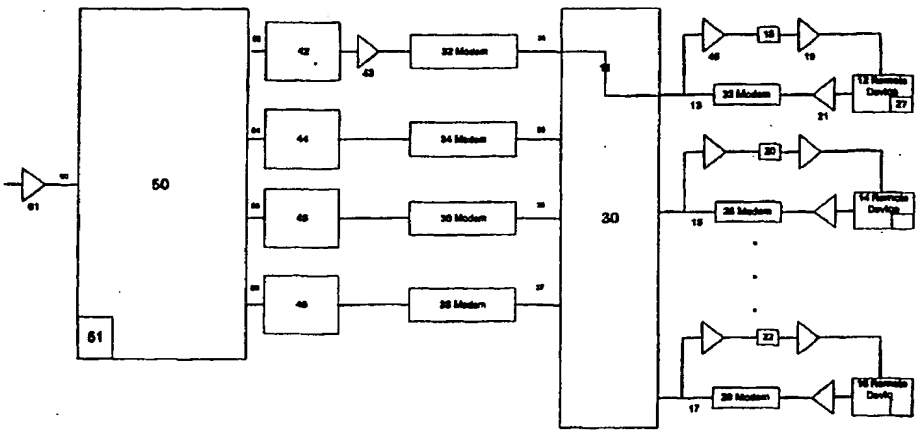

(57) Abstract

A remote device (12), such as a personal computer, may be connected to a host device (50), such as an Internet service provider (ISP) host computer, through a modem (24) located at the remote device (12) which is used to establish a dial–up connection (31). Upon receipt of information (61) or data at the host device (50) intended for a user of a remote device (12) that may be connected to the host (50), the host (50) signals the remote device (12) if the remote device (12) is not connected through the dial–up connection (31) to the host (50) at the time of receipt of the information (61) to the host (50). The remote device (12) in response to the signal (45) establishes in an unattended mode the dial–up connection (31) to the host (50) and also in an unattended mode causes the information (11) to be downloaded from the host (50). After completion of the download of information (11), the remote device (12) terminates the dial–up connection (31). The signaling (45) may occur through the telephone lines (13) used for the dial–up connection (31) or through additional devices (18). The user of the remote device (12) need only check for information stored (27) on the remote device (12) to determine if new information (27) has arrived, and need not establish another dial–up connection (31).

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PSEUDO DEDICATED LINE REMOTE INFORMATION DELIVERY SYSTEM

Background of the Invention

1. Field of the Invention:

The present invention relates generally to information transfer apparatus and methods, and more particularly to a method and apparatus for enabling telephonic transmission of data and other information transfer between a dial up host device and an initially offline remote device.

2. Description of the Prior Art:

The information age has seen dramatic improvement in the world-wide communication infrastructure that has enabled the relatively instantaneous access to and retrieval of vast amounts of digitized data and information which has been previously obtainable only through manual searching in written archives. However, many such archives remained unsearchable or virtually unattainable due to distances between the searcher and the location of the archives, or due to the searcher's lack of knowledge of the archive itself. Today, any individual with a personal computer has readily available virtually instantaneous access to the vast amount of data and information digitally stored world-wide.

The communication infrastructure generally includes a plurality of servers and a plurality of routers. All of the routers are interconnected to and/or through each other to form a network over which the data may be transmitted. The servers are also connected to this network and store the digitized information at addressable locations. this system of interconnected servers and routers is typically referred to as the Internet, the World Wide Web (WWW), and the Information Superhighway.

An individual, or internet user, may typically access the internet through a subscription service with an internet service provider (ISP) which maintains a host device. The user in turn telephonically connects to the host device through a dialup connection from a remote device, typically a personal computer. Once the user has established connection to the host device, the user can access data located at any server by

simply entering the Universal Resource Locator (URL), or address, of such data. The data located at the server identified by the URL is retrieved and transmitted through the routers back to the host device of the user who has requested the URL. The host device caches the data and retransmits it to the user's remote device where it may then be viewed, stored or printed. Thus, public domain data located on any server anywhere in the world is generally instantaneously available to any such user or individual simply by connecting to a host device and entering the URL of the desired data.

The user can even establish a scheduling routine at the ISP or with another service connected to the WWW in which a specific URL is periodically checked and monitored for updates. If such updates exist, the scheduling routine retrieves the data and has it forwarded to the user's ISP where it is cached. To retrieve the information, the user must log on to the ISP to check for the presence of new information or data cached at the ISP for such user. If such new data is available, the user may then download the data from the host. Typically, the user has no prior knowledge whether such data is in fact available at the time of logging on to the ISP host. Thus, the user may only infrequently check for such updates burdening the host with the storing of the data. Furthermore, the data may be frequently updated in the intervals between access by the user requiring the ISP to store even greater amounts of updated data in the forms of several generations of updates. It can then be readily seen and appreciated by those skilled in the art that as the volume of users subscribing to such services increases, the host becomes unacceptably burdened with establishing ever increasing amounts of memory capacity to store such user data awaiting download to all such user's remote devices

Compounding the aforementioned burden placed upon the ISP's for storing user data is the fact that the highest volume of data communicated over the Internet arises form the electronic exchange and transmission of messages originating by any one user and intended for receipt by any other user specified by the originator of the message. These messages are commonly transmitted, received and stored through mail servers, commonly referred to as SMPT, IMAP and POP servers, connected the Internet. This electronic messaging system is typically referred to as electronic mail or e-mail. In email, the originator of the message sends the message over a dialup connection to the SMPT server maintained by the originator's host. The SMPT server then places the message on the Internet. The message when so placed now contains a header or address portion

identifying the POP server to which it is to be routed, the identity of the host device associated with such POP server, and the subscriber to such ISP for whom the message is intended. Similarly as described above, the ISP for the recipient is now burdened with the storage of this, and a vast quantity of other, email messages awaiting retrieval by their intended recipients.

Another type of data communication between remote devices involves a technology known as internet telephone. Although the present usage for internet telephony is presently minimal in comparison to other uses of the internet, interest and demand for internet telephony are rapidly increasing due to the fact that internet telephony allows a user to connect to any other user located anywhere in the world, and then exchange in real time voice coded data with such user. As the data is encoded and decoded at each users remote device, real time conversation becomes possible.

More specifically, internet telephony requires enabling software in each remote device to encode speech into data for transmission and decode received data into speech. The telephony software interacts with the remote device sound card and web browser software so that the computer's speakers and microphones act as a telephone set. By using internet telephony, the originator of the telephone call need only make a local call to the ISP's dialup host to connect to an IP address anywhere on the World Wide Web. Thus, the originator beneficially avoids long distance tariffs and tolls which would have been incurred had the call been placed through the telephone service provider and telephone switches.

A disadvantage of limitation of internet telephony is that each remote device must be connected to their respective ISP host device prior to the internet call being placed. Thus, the originator and the recipient of the internet telephone call must pre-arrange a connection time between their respective remote devices. Known internet telephony does not use any type of signaling to the recipient remote device

To overcome this disadvantage in limitation of pre-arranging a connection time, there has been developed interface hardware to interconnect the remote device and the telephone set. For example, using a device made commercially available by Solram Electronics, an Israeli company, the originator of the call establishes a conventional

telephone connection through the originator's interface device to the intended recipient. The receiving interface device detects that the telephone connection is not a standard voice call but has originated from another identical interface device. The recipient's interface device then launches the appropriate software within the recipient's computer to initialize the computer for receipt of an internet call. Thus, one disadvantage and limitation of the above described interface device is that requires the user to establish first a conventional telephone call and bear the burden of incurring charges for such telephone call. Another disadvantage and limitation of the above described interface device is that it requires both the originator and recipient to purchase identical hardware in addition to the computer in telephone set.

Accordingly, there is a technique needed to establish remote device to remote device communication using standard dial-up lines without the need for additional compatible hardware to be purchased by each of the originator and recipient, and without the need for first establishing conventional telephone connections or pre-arranging a connect time. There is further needed a host resident capability for signaling the off line remote device when a data transfer is to be established. By meeting this need, data in the form of messages and e-mail may be received and downloaded by the ISP host machine that is in possession of such by first signaling the remote device for which the data is intended so that the remote device may power up and begin unattended download of such data from the host.

Presently, signaling and unattended download from the ISP host to the remote device of the user for whom data is present is not known to exist. Conventional ISP's do not contact each user who receives data or e-mail because the number of dialup connections the ISP would need to make to each subscribing remote user would be cost prohibitive to the ISP. In such an event, the ISP would pass through such cost as an increase to subscriber dialup access charges. the increase in service cost would be prohibitive to many such users. Furthermore, the quantity of such dialup connections would unacceptably burden the ISP host equipment. Accordingly, there exists a need for providing signaling from the host to the off line remote device to place automatically and unattendantly the remote device on line thereby enabling the remote device to request a download from the host.

Summary of the Invention

It is therefore a primary object of the present invention to overcome one or more of the disadvantages and limitations of the prior art enumerated hereinabove.

It is an important object of the present invention to provide host device to remote device signaling to enable the remote device to initiate connection to the host device.

According to a first aspect of the present invention, a technique for notifying an offline remote device that a host device has data and/or communications that may be transferred to the remote device is disclosed. A host device may be any computer or data processing system established to provide information services to distributed users such as an ISP or other internet or intranet, public or private, hubs. A remote device is a data recording or reception device such as a personal computer or other data client not collocated with the host device. The remote device is offline if it does not have a data connection with the host device. An online device has a data connection to the host device that may be a telephone line, a satellite link, a direct wire link or any conventional equivalent suitable for transferring any manner of digital data. A telephone line as used herein may be any conventional technology from a twisted pair of copper wires to a fiber optic strand or a satellite data link.

When the host device receives data intended for a remote device, the host device checks to determine if the remote device is currently online. If the remote device is online, it is notified that the data is available, or the data may be automatically downloaded to the remote device. As used herein, a download is a data transfer from the host to the remote device. If the remote device is not online, the host device may send a signal to the offline remote device to cause the remote device to establish an online data connection to the host device. The host device may use a coded ring signal or set of rings, such as ring once and hang up, to initiate the data connection. The host device may also use a coded signal similar to the caller ID signal or any other suitable conventional technique to initiate the data connection. The common advantage of each of these techniques is the host device does not incur a chargeable telephone call to the remote device, yet the remote device is signaled to come on line.

A caller ID type of coded signal may also be sent to the remote device to initiate the data transfer connection. Using caller ID, the originator's telephone number is identified during signaling, and before any telephone connection is made, thereby obviating connect charges. The remote device may then initiate a call back to the identified caller ID.

In any event, the remote device would then call the host back at the user's expense, if any, to collect the user's data. This signal from the host could be decoded by a device continuously monitoring the telephone lines without completing the telephone connection at the remote device and thus avoid creating a chargeable phone call for the host device or whoever initiated the call. This technique does not necessarily require the receiving station to avoid answering the telephone on the first ring because the coded signal could be sent and received before the receiving telephone could ring. A coded signal could also allow an almost unlimited number of hosts, each with a distinct code, to remotely initiate connections with remote devices.

In another aspect, the present invention provides a signal decoder at the remote device for decoding signals from the host device. The decoder may be any conventional device suitable for distinguishing the signal from the host device and initiating a return telephone call from the remote device to the host device on receipt of the appropriate signal. The signal decoder may be included in a modem for connecting a remote device to a telephone line.

In still another aspect, the present invention may include software for the remote device that allows the remote device to establish an online data connection and to initiate data transfer from the host to the remote device. The software may give the remote device the ability to upload stored data, such as outgoing e-mail, to the host device during a single telephone call initiated to download data from the host. As used here, upload is a data transfer from the remote device to the host device. The software would terminate the data connection as soon as the data transfer was complete between the host device to the remote device.

In a further aspect, the present invention provides software for the host device that allows the host device to identify which remote device has data to be downloaded and to

send the appropriate signal to the appropriate remote device to initiate a return call from the remote device and subsequent data transfer.

A still further aspect of the present invention includes a method of initiating a data download to an offline remote device, receiving data at a host intended for a remote device, determining if the remote device is online with the host, sending the data to the remote device if the remote device is online. If the remote device is offline, sending a signal from the host to the remote device to cause the remote device to initiate a procedure to establish an online connection to the host device, transferring the data from the host device to the remote device when the remote is online, and terminating the online connection to the host device at the completion of the data transfer.

In a currently preferred embodiment of the present invention the method of initiating a data download to an offline remote device further comprises the step of uploading data from the remote device to the host device after the host device has completed downloading data to the remote device but before the remote device terminates the online connection to the host device.

An advantage of the present invention is that the host device by signaling the remote device allows the remote device to initiate connection to the host device for receipt of data that the host device would otherwise need to store until the user desired to retrieve such data.

A further advantage of the present invention is that real time delivery of data and other information may be made to initially offline remote devices.

Yet another advantage of the present invention is that the signaling provided advantageously promotes the use of internet telephony. These and other features and advantages of this invention will become further apparent from the detailed description and accompanying figures that follow. In the figures and description, numerals indicate the various features of the invention, like numerals referring to like features throughout both the drawings and the description.

Brief Description of the Drawings

Fig. 1 is a block diagram of an information network according to a preferred embodiment of the present invention.

Fig. 2 is a high level flow diagram of a host signal sequence according to one embodiment of the present invention.

Fig. 3 is a high level flow diagram of a remote data retrieval sequence according to one embodiment of the present invention.

Fig. 4 is a schematic block diagram of one possible embodiment of a ring detector.

Description of the Preferred Embodiment

Referring now to Fig. 1, there is shown an information network 10 embodying a remote information delivery technique according to a preferred embodiment of the present invention. The information network 10 includes one or more remote devices, such as remote devices 12, 14 and 16, connected to a communication system 30 through modems 24, 26 and 28 and decoders 18, 20 and 22, respectively. Remote devices 12, 14 and 16 may be personal computers or any other conventional devices suitable for receiving or processing digital information. Modems 24, 26 and 28 may be any conventional modems to provide a data interface between communication system 30 and remote devices 12, 14 and 16. Communication system 30 may be any conventional communications network such a telephone system or private network. Decoders 18, 20 and 22 may be any suitable conventional devices configured to decode a telephone ring code or some other data code on communication lines 13, 15 and 17. For example, decoders 18, 20 and 22 may be separate hardware, or hardware incorporated into modems 24, 26 and 28. Alternatively, decoders 18, 20 and 22 may also be software drivers to command modems 24, 16 and 28. Decoders 18, 20 and 22 may monitor communication lines 13, 15 and 17 continuously.

The communication network 10 further includes a host device 50. Input/output (I/O) ports 52, 54, 56 or 58 of host device 50 may be connected to communication system

30 through modems 32, 34, 36 or 38 and coders 42, 44, 46 and 48, respectively. Host device 50 may have a dedicated network connection 60 that interconnects to other similar host devices. Host device 50 may be any conventional data source or server, such as an ISP or private or public, internet or intranet, host. Modems 32, 34, 36 and 38 may be any conventional modems to provide a data interface between communication system 30 and host device 50. Coders 42, 44, 46 and 48 generate coded signals such as coded signal 43 that are targeted to specific remote devices to initiate data delivery.

In a first embodiment of the present invention shown in Fig. 1, host device 50 receives data 61 such as an e-mail message or other data intended for a user of remote device 12. If remote device 12 doesn't have an active communication link to host device 50 when data 61 is received, receipt of data 61 triggers a call home sequence initiated by the host device 50, such as remote-call home sequence 53 shown in Fig. 2. Host device 50 may use modem 32 to dial the telephone number of remote device 12. At the completion of the dialing sequence, coder 42 controls communication line 31 to allow a predetermined ring signal, for example, only one ring and a hang-up. The single ring and hang-up operates as a call home signal 45 to decoder 18 that data is waiting at host device 50. Since each ring signal is followed by a fixed silent time prior to the next ring signal, the lapse of this time without a subsequent ring signal is decoded as a hang up by decoder 18.

Decoder 18 is configured to monitor communication line 13 for the predetermined ring signal, but not to pick-up the line. Signal 45 may be sent from host device 50 to decoder 18 without cost for use of communication system 30 because decoder 18 doesn't answer the ring signal. Receipt and decoding of signal 45 by decoder 18 initiates data retrieval sequence 25 shown in Fig. 3. Data retrieval sequence 25 may be any conventional means of initiating and following a series of preplanned steps.

Referring now to Fig. 3, a data retrieval sequence 25 is shown. Decoder 18 generates a start signal such as start signal 19 as shown at step 29. Start signal 19 is applied to remote device 12. If remote device 12 is in a sleep or energy conserving state when start signal 19 is received, start signal 19 triggers remote device 12 to wake up or go to full power. Alternatively, the start signal could be applied to a power management switch interposed between the remote devices power supply (not shown) and a utility

power source, such as a wall outlet. In this alternative construction, the remote device 12 is then powered on through its boot up sequence. Once triggered, remote device 12 responds to start signal 19 by using modem 24 to dial a telephone number which will cause communication system 30 to establish communication link 11 and connect remote communication line 13 with a host communication line such as communication line 31 as shown at step 23. Communication link 11 is a service of communication system 30 for which the user of remote device 12 has a subscription service or usage privileges such as on a corporate intranet. Modems 24 and 32 may use any conventional means to establish a communication link between remote device 12 and host device 50.

Using communications link 11, remote device 12 will notify host device 50 that remote device 12 has established a communications link in response to signal 45. Host device 50 will transfer data 61 to remote device 12. After the transfer of data 61 is complete, remote device 12 may then transfer data 21 to host device 50. Data 21 may be e-mail or any other information a user of remote device 12 may want to send to a host or another remote device. At the completion of all data transfer from the host device 50 to the remote device 12, remote software 27 may terminate communication link 11 and return remote device 12 to its initial sleep or energy conservation state. Alternatively, the power management switch may then be turned off.

In one particular embodiment of the present invention, coder 42 applies a coded signal 43 to communication line 31. Coded signal 43 may serve two distinct purposes. First, coded signal 43 allows host device 50 to notify remote device 12 that data is waiting without cost for use of communication system 30. Coded signal 43, in the case of caller ID signals, also permits a remote device to discriminate among multiple host devices that may gather data and signal receipt of the data. Receipt and decoding of coded signal 43 by decoder 18 generates a start signal such as start signal 19.

Data retrieval sequence 25 may be any conventional means of initiating and following a series of preplanned steps. In a currently preferred embodiment of the present invention, remote device 12 is a personal computer and data retrieval sequence 25 may be a series of software commands stored in memory. Upon actuation of data retrieval sequence 25, remote device 12 uses modem 24 to dial a telephone number which will cause communication system 30 to establish communication link 11 and connect

remote communication line 13 with a host communication line such as communication line 31.

With reference to Fig. 4, there is shown one possible embodiment of the decoder 18. Decoder 18 includes a ring detector 70 and a digital code generator 72. The ring detector 70 is connected to the subscriber telephone line, such as line 13 of Figure 1. In response to a selected one of single, multiple or specially coded rings provided by the telephone company, the ring detector 70 develops a signal for application to the code generator 72. Ring detector 70 can develop unique signals for different types of ring signals detected. The code generator 72 develops an ASCII code signal in response to the signal developed by the ring detector 70. Again the ASCII code signal developed by the code generator 72 may also be unique to a respective one of the signals developed by the ring detector 70. The ASCII code signal is then made available to a remote device, such as remote device 12, as start signal 19. The decoder 18 may be connected to the remote device 12 through any of the serial, parallel or USB ports available, or any other means such as IR or other carrier.

In addition to the ring signaling or caller ID signaling as hereinabove described, decoder 18 may also respond to signals sent via cellular telephone networks or remote paging networks. If the network 30 is part of a cable television system, the signaling may be included in the composite video signal, such as in the vertical sync signal. Furthermore, the signals may also be carried in any radio communication frequency band. The advantages of the present invention should now be apparent to those skilled in this art. For example, by providing signaling to the remote device to power up, establish a dialup connection, retrieve data and power down, the user has achieved all advantages of a dedicated line without the cost of such dedicated lines being incurred.

There has been described hereinabove preferred embodiments of the present invention in accordance with the requirements of the patent statutes. Those skilled in this art will understand how to make numerous uses of the present invention and changes and modifications in the present invention to meet their specific requirements or conditions. Such changes and modifications may be made without departing from the scope and spirit of the invention.

The Claims

What I claim as my invention is:

1. In a data communications network including a host device and a plurality of remote devices selectively connectable to said host device, said host device having an address database, said database having plurality of addresses, each of said addresses uniquely identifying a respective one of said remote devices, each of said remote devices having means for generating a data packet having and address portion and a data portion, and means for transmitting said data packet to said host device, said address portion selectively having one of said addresses defining an addressed one of said remote devices, said addressed one of said remote devices further including a user callable dialup instruction set to connect said remote device telephonically to said host device and a user callable message handler instruction set to access and retrieve said data portion from said host device, a message delivery system comprising:

means responsive to said address portion of each said data packet received by said host device for determining if said addressed one of said remote devices is currently connected to said host device;

means for developing a signaling code for transmission to said addressed one of said remote devices in the event said addressed one of said remote devices is not currently connected to said host device; and

means responsive to said signaling code for launching in an unattended mode each of said dialup up instruction set and said message handler instruction whereby said addressed one of said remotes devices becomes connected to said host device and said data portion is downloaded thereto.

2. A message delivery system as set forth in Claim 1 further comprising means responsive to completion of said data portion being downloaded to said addressed one of said remote devices for terminating each of said dialup instruction set and said message handler instruction set.

3. A message delivery system as set forth in Claim 1 wherein said launching means includes:

means for determining a present state of said addressed one of said remote devices:

means for changing said state of said addressed one of said remote devices to an active state in the event said addressed one of said remote devices is in an inactive state such that each of said dialup instruction set and said message handler instruction set may be launched.

4. A message delivery system as set forth in Claim 1 wherein said signaling code is a uniquely configured telephone ring signal distinguishable from a customary ring signal.

5. A message delivery system as set forth in Claim 4 wherein said addressed one of said remote devices further includes a modem, said modem in response to said uniquely configured ring signal establishing telephonic connection with said remote device, said launching means being further responsive to said modem establishing said telephonic connection.

6. A message delivery system as set forth in Claim 1 wherein said signaling code is a pager signal.

7. A message delivery signal as set forth in Claim 6 wherein said addressed one of said remote devices further includes means responsive to said pager signal to enable said addressed one of said remote devices to be responsive to each of said dialup instruction set and said message handler instruction set.

8. A message delivery system as set forth in Claim 1 wherein said signaling code is a caller ID signal embedded within a customary telephone ring signal.

9. A message delivery system as set forth in Claim 8 wherein said addressed one of said remote devices further includes means responsive to said caller ID signal to enable said addressed one of said remote devices to be responsive to each of said dialup instruction set and said message handler instruction set.

10. An information delivery system comprising:

a plurality of remote computers, each of said remote computers including a modem interconnecting each remote computer to a telephone network and means for uniquely addressing at least one other said remote computers;

at least one host computer interconnected to the telephone network;

said host computer including an identification database uniquely identifying each remote computer, said host computer including means for receiving addressed data from one of said remote computers and signaling another of said remote computers for which said addressed data is intended when said addressed remote computer is in a quiescent state;

said addressed one of said remote computers including means responsive to said signaling for changing the state of said addressed one of said remote computers to an active state and means for automatically establishing connection to said telephone network for connection to said host computer and for downloading said addressed data, said state changing means further returning said addressed one of said remote computers to a quiescent state upon completion of downloading of said addressed data.

11. A system as set forth in Claim 10 wherein said state changing means includes means for detecting a ring signal applied to said modem of said addressed one of said remote computers wherein said ring signal is uniquely configured to distinguish from a ring signal indicating a normal telephone call.

12. A system as set forth in Claim 10 wherein said state changing means include means for detecting a paging signal uniquely identifying said addressed one of said remote computers.

13. A system as set forth in Claim 10 wherein said state changing means include means for detecting an RF signal uniquely addressing said addressed one of said remote computers.

14. A system as set forth in Claim 11 wherein said state changing means includes a software driver for controlling said modem.

15. An information delivery system comprising:

a plurality of remote computers, each of said remote computers including a modem interconnecting each remote computer to a telephone network and means for uniquely addressing at least one other said remote computers;

a plurality of host computers interconnected to each other and each interconnected to the telephone network; said host computers each including an identification database uniquely identifying each of said remote computers associated therewith, said host computers including means for receiving addressed data originating from any one of said remote computers and signaling another of said remote computers associated with said host computer for which said addressed data is intended when said addressed remote computer is in a quiescent state;

said addressed one of said remote computers including means responsive to said signaling for changing the state of said addressed one of said remote computers to an active state and means for automatically establishing connection to said telephone network for connection to said host computer associated therewith and for downloading said addressed data, said state changing means further returning said addressed one of said remote computers to a quiescent state upon completion of downloading of said addressed data.

16. A system as set forth in Claim 15 wherein said state changing means includes means for detecting a ring signal applied to said modem of said addressed one of said remote computers wherein said ring signal is uniquely configured to distinguish from a ring signal indicating a normal telephone call.

17. A system as set forth in Claim 16 wherein said detecting means includes a ring detector and a digital code generator, said ring detector being responsive to one of said single ring, multiple ring or unique ring signals to develop a ring detected signal, said code generator being responsive to said ring detected signal for developing an ascii code signal, said state changing means being responsive to said ascii code signal.

18. A system as set forth in Claim 15 wherein said state changing means include means for detecting a paging signal uniquely identifying said addressed one of said remote computers.

19. A system as set forth in Claim 15 wherein said state changing means include means for detecting an RF signal uniquely addressing said addressed one of said remote computers.

20. A system as set forth in Claim 15 wherein said state changing means includes a software driver for controlling said modem.

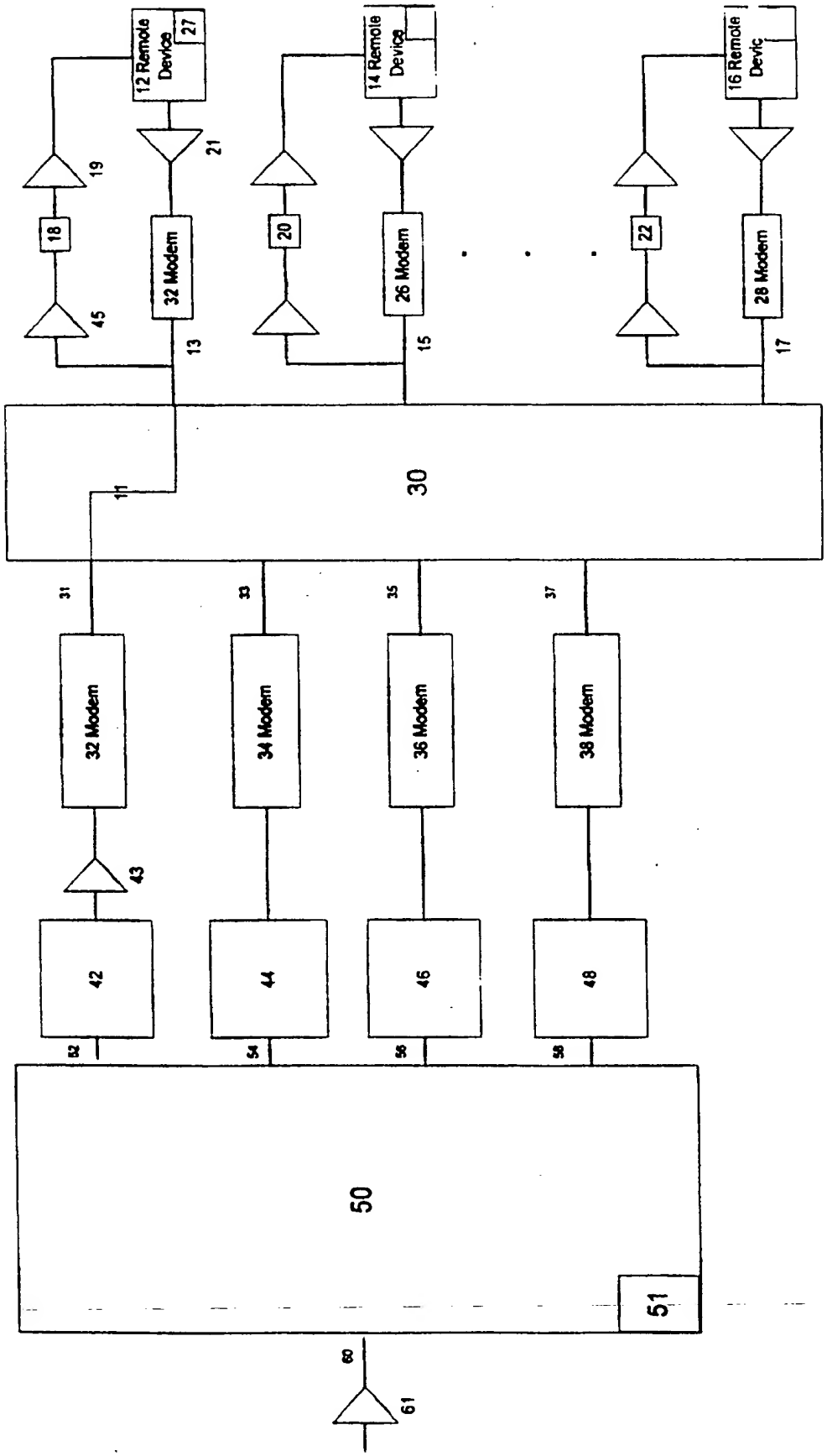

Figure 1

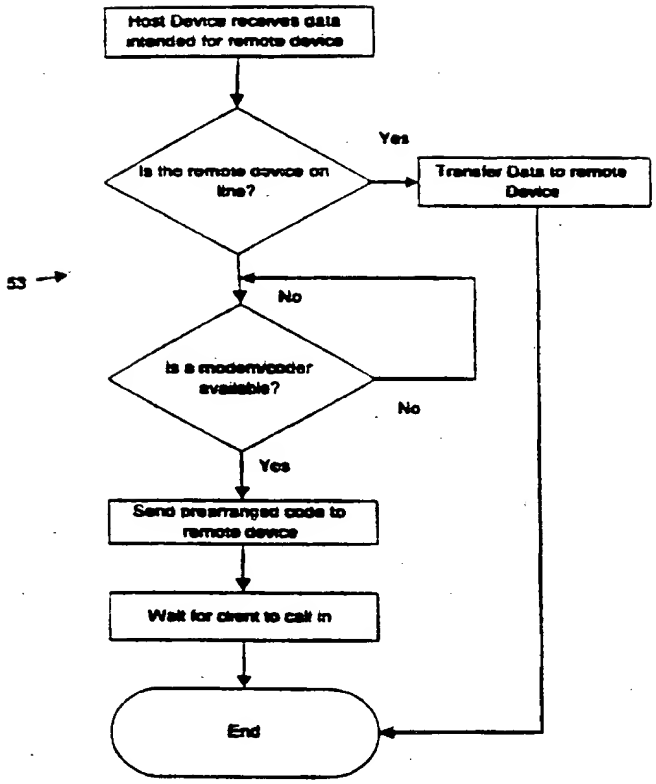

Figure 2 (Host Side)

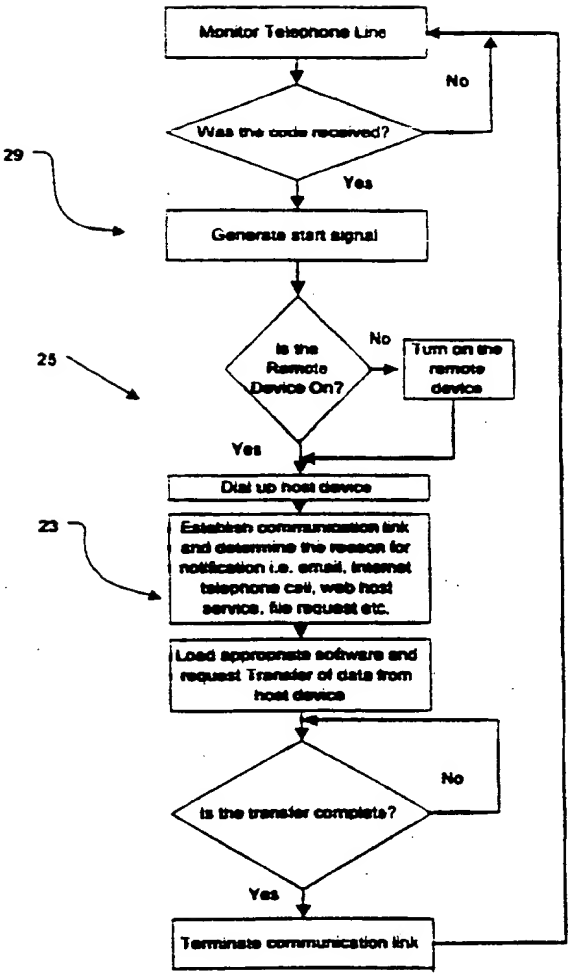

Figure 3 (Remote Device Side)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/00427

A. CLASSIFICATION OF SUBJECT MATTER
IPC(6) : H04M 1/00; G08B 23/00
US CL : 379/102.02; 340/313; 709/227
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 379/93.25, 102.02; 340/313; 709/227; 375/222; 370/525, 465

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,P ----- A	US 5,809,118 A (CARMELLO ET AL.) 15 September 1998, Fig. 1A, col. 6, lines 21-35. Fig. 1A, col. 7, lines 6-20.	8,9 ------- 1-7,10-20
A,E	US 5,892,432 A (SKOOG) 06 April 1999, Fig. 1, col. 3, lines 40-59	6,7,12,13,18,19
Y	SuperVoice 2.2 User's Guide, Pacific Image Communications, 24 March 1995, Appendix E	8,9

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 27 MAY 1999	Date of mailing of the international search report 16 JUN 1999
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